



Massachusetts Alternative Septic System Test Center

## **Construction Summary for Layered Soil Treatment Area (LSTA) to be installed under the Demonstration Project**

*A primer for board of health members, septic system designers  
and installers*

**Note:** *The following describes a demonstration project by which Barnstable County Department of Health and Environment (BCDHE) in collaboration with others, intends to install modified Soil Treatment Areas (STA) alternately known as leachfields at various residential pilot locations to test their effectiveness. The following describes various aspects of the project and is meant for health agents, system designers and system installers.*

### **What is a Layered Soil Treatment Area (LSTA)?**

A LSTA is basically a leachfield that is placed in layers, using materials that allow for the successive nitrification and denitrification of septic tank effluent as it percolates through the layers.

The Barnstable County Department of Health and Environment in collaboration with others and with information gleaned from many sources, has been experimenting with various configurations of LSTA at the Massachusetts Alternative Septic System Test Center over the past few years. We have received funding from various sources to place Pilot Systems at residences. To minimize the risk of failure at the pilot locations, certain design features have been incorporated in these pilot project sites and are described below.

### **Ideal sites for consideration of the layered system.**

The ideal site for a pilot LSTA installation is one that enables a strip-out to an elevation of four feet below existing grade. In this excavation 18 inches of a sand-sawdust mix is first placed over a two-inch layer of washed pea stone followed by 18 inches of "Title 5" sand. Atop the sand layer, the distribution system will be placed (shallow pressurized drainfield product, drip dispersal). The placement of a liner/barrier around the lower sand/sawdust layer is also required. The sequence would be as follows:

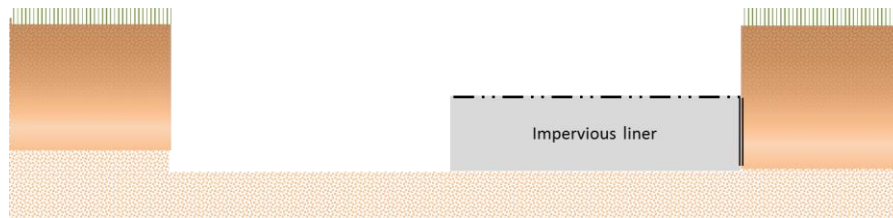
### STEP 1

Excavate areal area required to a depth of at least four feet.



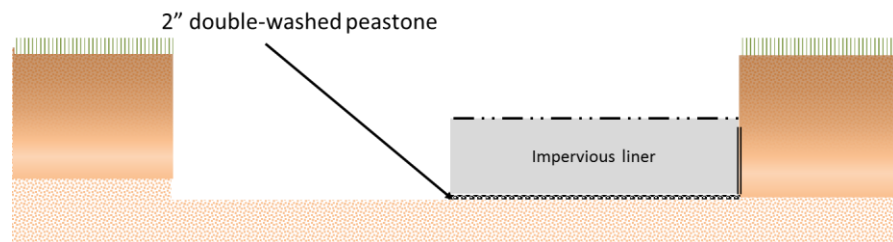
### STEP 2

Place 20 mil impervious liner around perimeter of excavation ONLY ON THAT PORTION OF THE SYSTEM DESIGNATED TO RECEIVE THE PEA STONE AND THE SAND/SAWDUST MIXTURE. Hold in place with geotextile staples or other suitable method.



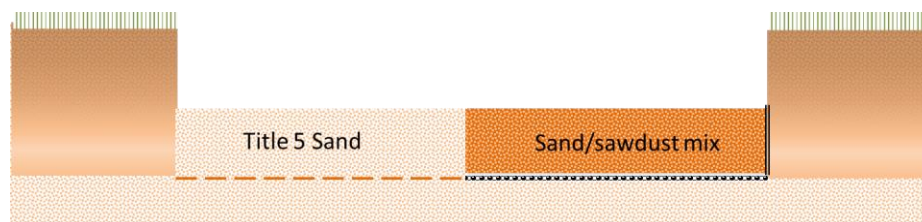
### STEP 3

Place 2 inches of double-washed pea stone under portion of system that will receive the sand/sawdust.



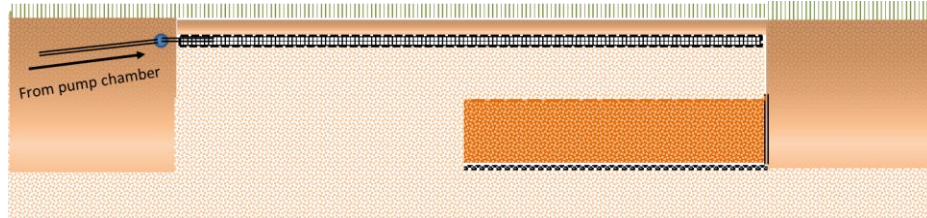
### STEP 4

Place 18 inches of sand/sawdust mix in excavation (use light plate compactor after 12 inches and again at final grade to obtain 18 inches ONLY IN AREA DESIGNATED FOR TREATMENT. Fill the adjacent area with Title 5 sand.



## Step 5

Place Title 5 sand to an elevation appropriate to the distribution method (drip, shallow pressurized drainfield, GeoMat™) 18 inches in depth above the sand/sawdust layer and install distribution system and cover.

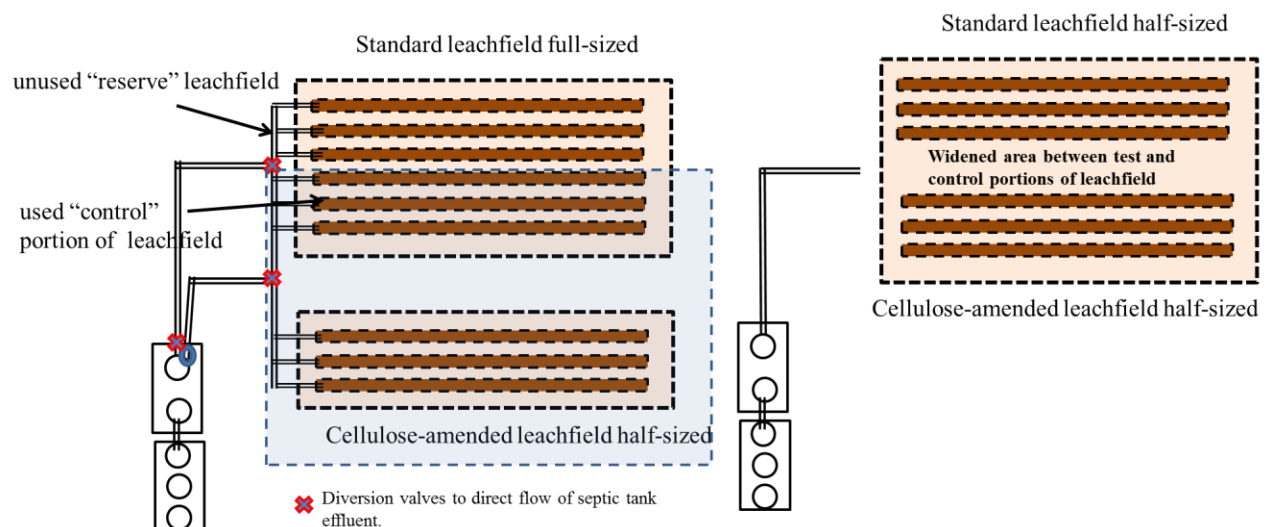


## Why is the sawdust in only half of the STA?

You will read above that certain measures are being taken to minimize the risk of placing this pilot system at their residence. The design team decided that splitting the system into halves has two advantages. Foremost, in the unlikely event that the sawdust mixture causes a hydraulic failure, the homeowner will still have the remaining Title 5 system to disperse wastewater. Secondly, the halving of the system will allow a comparison between the amended STA with a standard Title 5 system.

## Is there another way to minimize the risk to the homeowner?

Yes. There are two configurations possible in the pilot. The ideal situation is where an installation of a complete Title 5 system and an additional half sized system with an amended STA. The two possibilities are sketched below.



**Figure A**

**Figure B**

Figure A above shows the situation where one-half of the Title 5 system is used in conjunction with a layered STA (LSTA). In the event of a failure of the LSTA portion, a few “diversion” valves as shown above are turned and the homeowner is left with a full-sized Title 5 system. In the event of a failure in the situation shown in Figure B above, the homeowner would have a half-capacity system.

Homeowners that choose to have a configuration like Figure B above will be asked to sign a waiver that releases the County, designer and the contractor from all liability in the event of a failure in the amended section of the STA. This is because if the amended portion of the STA fails hydraulically, the responsibility to replace the section of the STA would be the homeowner’s. This legal paperwork is presently being drafted.

### What about sampling of the system?

Under the grant, samples will be taken monthly for two years. Samples will be taken from the pump chamber as well as from a series of pan lysimeters under the system. In addition, water use and pump-run counters will be checked during each sampling event. Following the period of the grant, the homeowner will be responsible for causing an annual inspection of the system and any monitoring required by the Commonwealth’s DEP. We anticipate that annual monitoring will be required and annual inspection and adjustment of the low-pressure distribution system will be needed. A checklist for this requirement is being prepared.

During each installation, pan lysimeters will be placed at four places (two under each of the STA and LSTA). Pan lysimeters are essentially “pans” that collect percolating water and convey it to a collection point. The placement of pan lysimeters is illustrated in a typical system below.

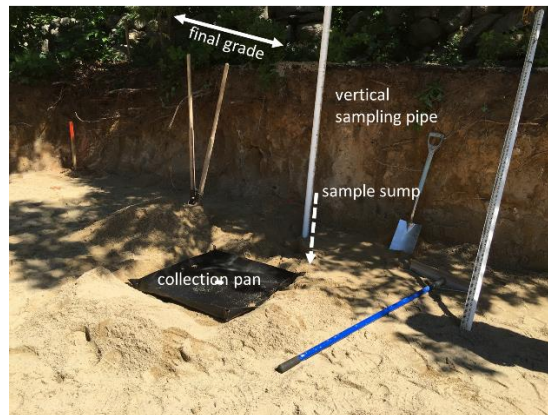
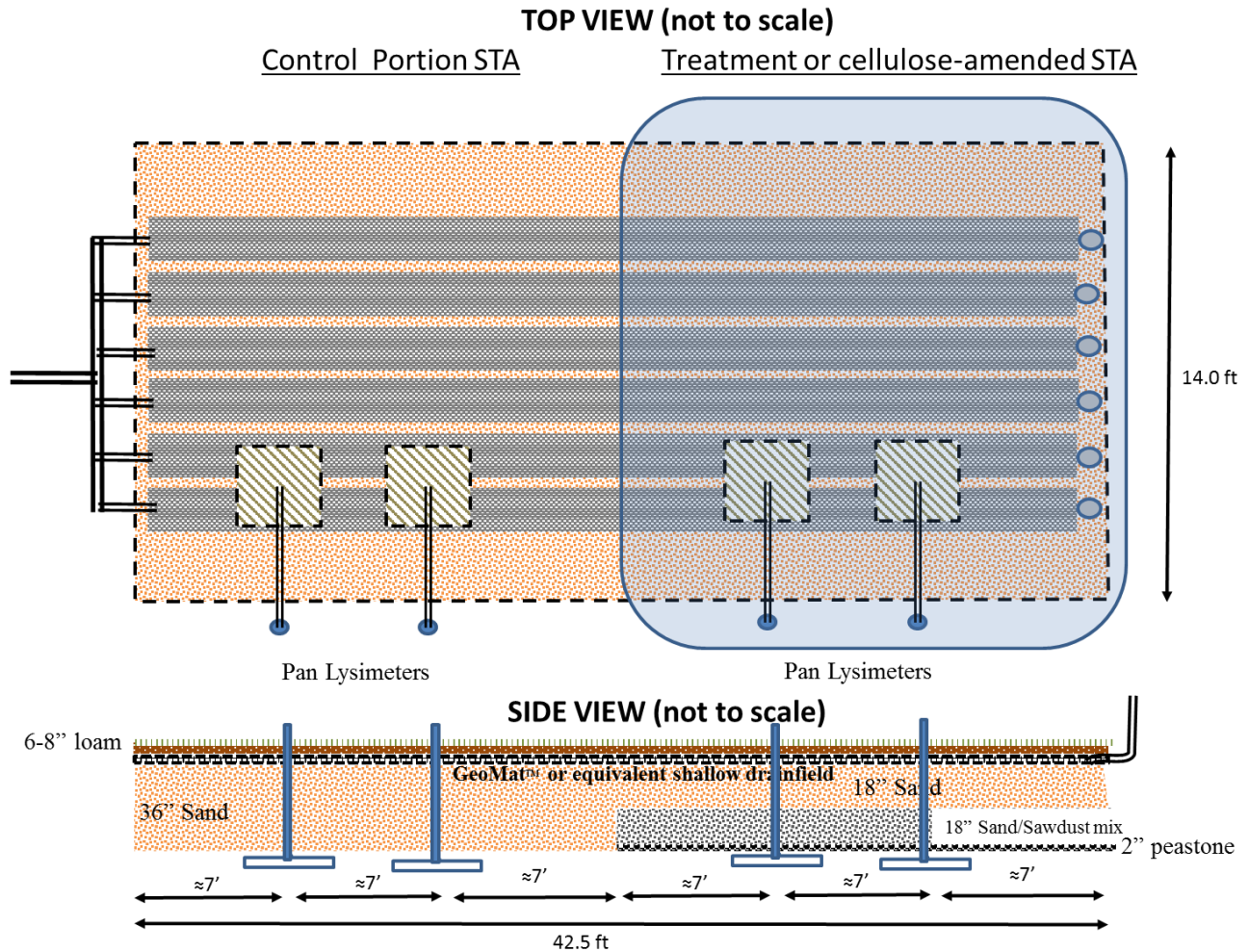
### Will there be some assistance with permitting?

As part of the SNEP Grant, our partners at the Buzzards Bay Coalition have been helping with permitting. Korrin Petersen will attend the meeting of the board of health to answer questions, as may George Heufelder with Barnstable County Department of Health and Environment. We will also be providing assistance for system designers. In some cases, we will meet with the homeowners to make sure they understand the experimental nature of the project and their responsibilities for long-term operation and maintenance.

### Long Term Maintenance?

As mentioned above and in accordance with Title 5, all pressure dosed systems must be maintained annually. The homeowners in this program will be informed and must agree to this and any other monitoring requirements. The systems will be registered with the Barnstable County Tracking Program and there will be online access to the information for your board of health.





Pan lysimeters will be fabricated and installed by staff of Barnstable County Department of Health and Environment. The vertical sampling port will be protected by a standard curb box. Other sampling ports may be required.

Other inspection ports and sampling devices may be installed. These installations may suspend fill operations for short periods of time and will be installed by personnel of the Barnstable County Department of Health and Environment.

## Please remember

As we have said all along, the systems installed under this program are experimental. While we have taken design steps to minimize the risk of harm to the public health and environment, there is still some risk that the system may not perform to the expected standard. Some homeowners who allow a system sized at 1.5 x the design flow as described above will bear little risk of having to replace their system if there is some hydraulic failure (since we can merely turn a few valves and have a fully-complying leachfield. Others who install the system as in Figure B above will be signing a waiver noting that they will be responsible for any repairs necessary to the non-complying portion of the system should it fail by Title 5 criteria.

For designers, we will be available to consult on your design plans. In addition, any pressure dosed system designs that incorporate a Perc-Rite® Drip Dispersal System or a low pressure-dosed system using GeoMat® will have assistance from Oakson, Inc. or GeoMatrix LLC respectively. Other low-pressure dosed dispersal means over the nitrifying layer will be considered.

Barnstable County Department of Health and Environment will be holding some introductory sessions on the technology and the results in your area. If you are interested in attending one of these sessions, please send an email to George Heufelder at the email address below.

## Project Partners

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